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Fact Sheet	
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Glutaraldehyde

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Health Hazard Summary: *The most common effect of overexposure to glutaraldehyde is irritation of the eyes, nose, throat, and skin. Glutaraldehyde can also cause asthma and allergic reactions of the skin.*

HOW TO FIND OUT IF YOU ARE WORKING WITH GLUTARALDEHYDE

Odor and Appearance: Glutaraldehyde is most often available as 50%, 25%, or 2% solutions in water. A 2% glutaraldehyde solution is "activated" by alkali for use as a broad-spectrum disinfectant. Glutaraldehyde solutions are pale yellow liquids that smell like rotten apples. Glutaraldehyde is slow to evaporate into the air unless heated.

Some synonyms and trade names for glutaraldehyde and glutaraldehyde products are:

glutaral	Cidex[R]
glutaric aldehyde	Glutarex[R]
glutardialdehyde	Sonacide[R]
Glutarolglutaric dialdehyde	Sonacide[R]
1,5-pentanedial	Verucasep[R]
1,5-pentanedione	1,3-diformylpropane

Uses: Glutaraldehyde is used as a sterilant and disinfectant, leather tanning agent, tissue fixative, embalming fluid, resin or dye intermediate, and cross-linking agent. It is also used in X-ray film processing, in the preparation of dental materials, surgical grafts, and bioprostheses, and as a fixative for electron microscopy.

Your Right to Know: Under California's Hazard Communication Standard (Cal/OSHA regulation *GISO 5194*), your employer must tell you if you are working with any hazardous substances, including glutaraldehyde, and must train you to use them safely.

If you think you may be exposed to hazardous chemicals at work, ask to see the Material Safety Data Sheets (MSDSs) for the products in your work area. An MSDS lists the hazardous chemicals in a product, describes its health and safety hazards, and gives methods for its safe use, storage, and disposal. An MSDS should also include information on fire and explosion hazards, chemical reactivity, first aid, and methods for handling leaks and spills. Your employer must have an MSDS for any workplace product that contains a hazardous substance, and must make the MSDS available to employees on request.

This Fact Sheet is an aid for worker training programs. It does not take the place of a Material Safety Data Sheet.

HOW GLUTARALDEHYDE ENTERS AND AFFECTS YOUR BODY

Glutaraldehyde can affect you when you breathe its vapor or touch the liquid. Glutaraldehyde mainly affects the first body tissue it touches (usually the eyes, nose, throat, and lungs, or the skin). The most common effect of overexposure is irritation of the eyes, nose, throat, and skin, as described below.

Eyes, Nose, and Throat: Glutaraldehyde vapor in the air can cause teary eyes, burning nose, sore throat, coughing, and headache. These effects can occur when the amount of glutaraldehyde in the air is about 0.1"ppm" (the legal exposure limit is 0.2 ppm - see "Legal Exposure Limits" on page 3).

Direct contact with liquid glutaraldehyde severely irritates the eyes and can cause permanent eye damage. *In case of eye contact, immediately rinse the eyes with water for 15 minutes and then seek medical attention.*

Skin: Glutaraldehyde can remove your skin's natural protective oils. This can irritate the skin and cause dermatitis (skin rash), with dryness, redness, flaking, and cracking of the skin. Glutaraldehyde easily soaks through ordinary clothing and can severely burn the skin beneath it. Repeated skin contact can also cause an allergic skin reaction, with redness, itching, hives, and blisters.

Lungs: Glutaraldehyde vapor can irritate the lungs, causing chest pain and shortness of breath.

Repeated exposure to glutaraldehyde can cause asthma. Asthma has occurred even in people exposed to low levels of glutaraldehyde (0.05 ppm). Symptoms of asthma include chest tightness, shortness of breath, wheezing, and coughing. A person who has developed asthma can react even to very small amounts of glutaraldehyde or other irritant chemicals.

Cancer: Whether glutaraldehyde can cause cancer in humans has not been studied. It does not cause genetic mutations in most laboratory tests. This suggests that it is unlikely to cause cancer. However, it is closely related to the cancer-causing chemical formaldehyde. Glutaraldehyde is now being tested to see whether it causes cancer in animals that breathe its vapor.

Reproductive System: Whether glutaraldehyde can affect the reproductive system has not been studied thoroughly. In limited studies, it did not harm the offspring of animals exposed during pregnancy. Glutaraldehyde is believed to be unlikely to affect pregnancy or reproductive function so long as exposure levels are below those that cause noticeable symptoms.

Glutaraldehyde has not been tested to see whether it could affect male reproductive function.

TESTS FOR EXPOSURE AND MEDICAL EFFECTS

Glutaraldehyde reacts quickly with body tissues and does not stay in the body for long. No test can accurately measure the amount of glutaraldehyde in the body, so routine testing is not recommended or required.

Patch testing can be used to diagnose allergic contact dermatitis. Inhalation challenge testing by a pulmonary specialist can be used to determine whether asthma may be related to glutaraldehyde exposure.

It is generally recommended that workers who are regularly exposed to hazardous substances get a complete physical examination, including an occupational and medical history, at the beginning of their

employment. They should also have periodic follow-up examinations.

LEGAL EXPOSURE LIMITS

California's Division of Occupational Safety and Health (Cal/OSHA) sets and enforces workplace chemical exposure limits. Cal/OSHA has set a Ceiling Limit for the amount of glutaraldehyde in workplace air. The Ceiling Limit for glutaraldehyde is 0.2 parts of glutaraldehyde in each million parts of air (0.2 "parts per million," or 0.2 "ppm"). This is about equal to 0.8 milligrams of glutaraldehyde per cubic meter of air (0.8 mg/m^3). Legally, your exposure must never exceed this Ceiling Limit for any period of time.

Concentrations of glutaraldehyde lower than the legal limits can cause eye, nose, and throat irritation as well as asthma. These effects have been reported to occur at glutaraldehyde levels as low as 0.05 to 0.1 ppm.

Although Cal/OSHA does not prohibit skin contact with glutaraldehyde, it is important to avoid skin contact with it in order to avoid serious burns.

According to one report, many people can smell glutaraldehyde at a concentration of 0.04 ppm; however, some people may not smell it even at higher levels. Eye, nose, and throat irritation can occur at about the same exposure level. If you can smell glutaraldehyde or feel its irritant effects, you may be getting overexposed, and may run a risk of developing asthma. However, measuring the amount of a substance in the air is the only reliable way to determine the exposure level.

If you think you may be overexposed, talk to your union or your supervisor. If any worker might be exposed to a substance at more than the legal limit, the employer must measure the amount of the substance in the air in the work area (Cal/OSHA regulation *GISO 5155(e)*). You have the legal right to see the results of monitoring relevant to your exposure (*GISO 3204*).

You also have the right to see and copy your own medical records, and records of your exposure to toxic substances. These records are important in determining whether your health has been affected by your work. Employers who have such records must keep them and make them available to you for at least 30 years after the end of your employment.

REDUCING YOUR EXPOSURE

Your employer is required to protect you from being exposed to chemicals at levels above the legal limit. Cal/OSHA and Cal/OSHA Consultation Service can help you and your employer - see the "Resources" section below.

Substitution: The most effective way to prevent harmful exposure is to use a safer chemical, if one is available. However, the health and safety hazards of substitutes must also be carefully considered, to

make sure that they are actually safer.

Engineering Controls: Whenever possible, employers must use engineering control methods rather than personal protective equipment to prevent overexposure. Engineering control methods include installing ventilation, changing the work process, and changing work practices. Containers of glutaraldehyde should be tightly covered to prevent evaporation. Certain work processes can be isolated, enclosed, or automated to reduce exposures.

Local exhaust ventilation systems ("hoods") are the most effective type of ventilation control. These systems capture contaminated air at its source before it spreads into the air you breathe.

Personal Protective Equipment: If skin contact with glutaraldehyde is likely, protective equipment such as gloves, goggles, or faceshields should be worn. Protective clothing should be made of a material that is resistant to glutaraldehyde, such as butyl rubber, neoprene, polyvinyl chloride, or Viton. Even the most resistant materials will be penetrated quickly and can become dangerous, so gloves should be replaced often.

When engineering controls cannot reduce exposures enough, a respirator must be worn and a respiratory protection program must be developed, as described in detail in Cal/OSHA regulations (*GISO 5144*). An industrial hygienist or other trained person should be consulted, to make sure that the equipment is appropriate and is used correctly.